

**The Effects of Homogeneous versus Heterogeneous Reading–Style
Grouping on EFL Students’ Non–Preferred Reading Style and
Reading Comprehension**

Abdel Salam Abdel Khalek El-Koumy

**Professor of Curriculum and Instruction of
English as a Foreign Language at
Suez Canal University, Egypt**

January 2009

Abstract

The purpose of this study was to investigate the effects of homogeneous versus heterogeneous reading-style grouping on EFL students' non-preferred reading style and reading comprehension. The study used a pretest-posttest experimental design. The original subjects of the study (N=86) were Egyptian English major senior students during the 2005/2006 academic year. At the beginning of this academic year, the Analytic/Global Reading Styles Inventory (AGRSI) was administered to these subjects to measure each student's analytic and global reading styles. Based on their scores on the inventory, strongly analytic and strongly global subjects (N= 62) were randomly assigned to homogeneous and heterogeneous groups. Afterwards, both groups were tested to measure each student's reading comprehension before treatment using the Reading Comprehension Test developed by the researcher. Each group was then randomly assigned to pairs. During treatment, the members of each pair alternatively exhibited their reading behaviors by thinking aloud while reading and sharing answers to post-passage questions after reading. The study lasted for 28 weeks, one ninety-minute session per week. After treatment, the AGRSI and the Reading Comprehension Test were readministered to both groups to measure each student's non-preferred reading style and reading comprehension. The differences in the pre-to-posttest improvement between the two groups were then analyzed for significance using ANCOVA. The results indicated that the heterogeneous group students demonstrated significantly greater pre-to-posttest improvement in both their non-preferred reading style and reading comprehension than the homogeneous group students [$f(1, 59)=60.33, p < 0.001$; $f(1, 59)= 43.18, p < 0.001$, respectively]. Based on these findings, the researcher concludes that the non-preferred reading style can be developed when students learn with and from others with different reading styles and that reading comprehension is neither a bottom-up nor a top-down process but an interaction between the two. Therefore, it demands the development and integration of both the left and right hemisphere functions of the brain. The study concludes with suggestions for further research.

Introduction

Group work has been and continues to be used for teaching reading comprehension because of its multiple advantages. These advantages include activating and extending prior knowledge (Moore, 1995; Uttero, 1988), developing thinking skills (Brown and Palincsar, 1989; Goldenberg, 1992; Stevens, Slavin and Franish, 1989), improving attitudes towards reading (Madden, 1988), increasing self-esteem (Foot and Howe, 1998; Jacob, 1999; Johnson and Johnson, 1989; Rapp, 1991), and helping teachers to manage large classes and to exercise more control in them (Bassano and Christison, 1988; El-Samaty 2000; Emmer, Evertson and Worsham, 2000; Greenwood, Carta and Hall, 1988; Touba, 1999). Despite these considerable advantages, it is common to hear many Egyptian EFL teachers say that they used group work, but it did not work with their classes. Support for this statement comes from many ELT practitioners around the world (e.g., Alexander, Rose and Woodhead, 1992; Jacobs, 1988; Wheeler, 1994). Such practitioners assert that simply placing students in groups does not ensure that they will cooperate in constructive and effective ways. Jacobs (1988), for example, notes that groups do not necessary equal co-operation. Many educational researchers (e.g., Carrier and Sales, 1987; Klein, Erchul and Pridemore, 1994; Milleret, 1992; Wong Fillmore, 1985) have also found that group work

is not invariably successful. In this respect, Slavin (1990b) states: "Traditional group work, in which students are encouraged to work together but are given little structure and few incentives to do so, has been repeatedly found to have small or nonexistent effects on student learning" (pp. 30-31). Similarly, reflecting on group work research in the UK, Bennett and Dunne (1991) report that merely having pupils learn in groups does not automatically promote their performance. Referring to other researchers' studies on group work, they (Bennett and Dunne) further state:

Research on ... groups has shown that in reality these [groups that consist of four to six children] are no more than collections of children who sit together but work on individual tasks. In other words, pupils work in groups but not as groups. Not surprisingly, levels of cooperation are low, as are the frequencies of explanation and knowledge sharing (Bennett, Desforges, Cockburn & Wilkinson, 1984; Galton, Simon & Croll, 1980). (1991, p. 104)

In their discussion of the possible reasons that explain why some groups do not function effectively, many educators (e.g., Cooper, Marquis and Edward, 1986; Salomon and Globerson, 1989; Slavin, 1983) state that a group's failure to optimally achieve its leaning potential may be due to social loafing,

free-riding, and diffusion of responsibility. In the same vein, many social psychologists (e.g., Fandt, Cady and Sparks, 1993; Kerr, 1983; Kerr and Bruun, 1983; Nagasundaram and Dennis, 1993; O'Connor, Gruenfeld and McGrath, 1993; Reid and Hammersley, 2000) assert that group work can cause many problems to group members. For example, O'Connor, Gruenfeld and McGrath (1993) state:

Group members get jealous of or bored with one another, they feel insulted or wronged by other members, they disagree on task solutions or approaches to problems, they discover serious differences among themselves in values and attitudes, and so on. (p. 362)

In order for group work to be effective, many educators (e.g., Bennett, 1998; Bennett and Cass, 1988; Jacobs and Hall, 1994; Wiener, 1986) argue that teachers should pay careful attention to the size and composition of the learning groups. With respect to group size, there has been a remarkable agreement that small groups have advantages over large groups. According to Johnson, Johnson, Holubec and Roy (1984) small groups take less time to get organized. It's also very difficult to drop out of a small group (Kohn, 1987; Vermette, 1998). Also, learning in small groups, as Hertz-Lazarowitz,

Sharan and Steinberg (1980) state, "provides for the acquisition of social skills needed for sustaining cooperative interaction" (p. 105). In contrast, large groups, as Dansereau (1987) states, "are more likely to result in the formation of coalitions and passivity on the part of some students" (p. 618). Pennington, Gillen and Hill (1999) and Watkins (2004) assert that as group size increases individual motivation to participate decreases and free-riding increases. Moreover, in an experimental study, Bada and Okan (2000) have found that Turkish students, in the ELT Department of the Faculty of Education at Çukurova University, do not like working in large groups. They conclude from their study that "students feel more comfortable, productive and relaxed by working ... in pairs, where their voices would be heard, and views listened to and valued" (p. 4).

With regard to group composition, there has been considerable discussion surrounding the question of what constitutes a successful group. Some educators (e.g., Chorzempa and Graham, 2006; Mathes and Fuchs, 1994; Topping, 1998) suggest that students should be grouped by their ability levels. However, this type of grouping, as McGreal (1989) states, can cause problems when inferior students find out who they are. Abadzi (1984), Feeney (1992), George (1993), Hoffer (1992), Slavin (1988) and Wheelock

(1992) assert that ability grouping hurts lower ranking students and damages their self-esteem. Oakes (1985, 1986) also contends that students in the lower track are usually seen by others as dumb and see themselves in this way. Fiedler, Lange and Winebrenner (1993) and Mathison, Freeman and Wilcox (2004) add that students in the higher track develop an elitist attitude which is detrimental to the social climate of the classroom. Furthermore, many research studies do not support the use of ability grouping to improve academic achievement (e.g., Gamoran, 1987; Slavin 1987, 1988). For reviews of research in this area, see Barr (1995), Kulik and Kulik (1982), Lindle (1994) and Slavin (1990a). In view of the disadvantages of ability grouping, several educational experts such as Braddock and Slavin (1993) argue that this type grouping is not the way to go and it should go away.

Due to ability-grouping failure, many educators (e.g., Ben-Ari, 1997; Driver, 2003; Martin and Paredes, 2004; Riding and Sadler-Smith, 1997; Sadler-Smith, 1998; Sudzina, 1993; Volkema and Gorman, 1998) suggest assigning students to groups according to their cognitive/learning styles, as an alternative to ability grouping, to make group work effective and successful. As Sudzina (1993) puts it: “Rather than ability grouping, it appears that grouping students for reading based on their reading styles would enhance

reading” (p. 19). However, some of these educators call for grouping students of the same style while others call for grouping students of different styles. Each type of grouping, as its supporters claim, has several advantages over the other. Surprisingly, in the vast literature on the teaching of reading comprehension in the contexts of both mother tongue and foreign language classrooms, no studies have sought to determine which one of these style grouping better affects students’ non-preferred reading style or reading comprehension. Therefore, this study focuses on the effects of reading-style homogeneity versus heterogeneity within-class groups on EFL students’ non-preferred reading style and reading comprehension at the university level. The significance of this study lies in the fact that its results could help Egyptian EFL instructors to manage the large classes they face everyday. It is also hoped that the results of the study could help learners to improve their reading comprehension which is considered the biggest requirement for their success in FL learning.

Theoretical Framework

The theoretical framework of the present study is organized around the brain lateralization theory and Bandura’s social-cognitive theory. Both theories are discussed below.

The brain lateralization theory – developed by the Nobel prize winner Roger Sperry and his colleagues – contends that as the human brain matures certain functions become lateralized to the left hemisphere and certain other functions become lateralized to the right hemisphere and each hemisphere becomes specialized to perform its functions almost independently of the other. The left hemisphere, in general terms, becomes specialized in logical, analytic and objective functions whereas the right hemisphere becomes specialized in intuitive, synthetic and subjective functions. This hemisphericity – specialization of hemispheres – is based on the way in which information is processed by each hemisphere. Each hemisphere, as Sperry (1974) states, has its own “private sensations, perceptions, thoughts, and ideas all of which are cut off from the corresponding experiences in the opposite hemisphere” (p. 7). The left hemisphere tends to process information in a linear, sequential and logical manner dealing with details and features while the right hemisphere tends to process information in a holistic way dealing with colors and shapes. More specifically, the predominantly left-brain learner processes parts of information (such as letters, morphemes, words, phrases, grammatical cues and discourse markers) to understand a whole text. The predominantly right-brain

learner, in contrast, processes the whole text before the examination of parts is complete and even when some parts are missing or vague.

The brain lateralization theory also proposes that the degree of lateral specialization varies among individuals due to inherited genetic factors. And as a result, people differ in their cognitive/learning styles which are typically seen as innate, hard-wired preferences; and therefore, resistant to training and change over time.

In line with the foregoing assumptions, supporters of the brain lateralization theory (e.g., Ausburn and Ausburn, 1978; Felder and Henriques, 1995; Leonard and Straus, 1997; Oxford, 1989; Oxford, Ehrman and Lavine, 1991; Peacock, 2001; Reid, 1987, Riding, 1991, 1994, 1997; Riding and Cheema, 1991; Riding, Glass and Douglas, 1993; Riding and Rayner, 1998; Smith, 2004; Witkin, 1973) argue for matching each student's preferred style with educational interventions that best suit this style to activate and maximize his/her learning potentials even if these interventions conflict with what is effective in class. These supporters add that through matching teaching/curricular style with each student's preferred style, learning takes

place with greater ease, maximum energy flow and fruitful results. As Butler (1988) puts it:

A student who learns in his/her naturally dominant style is more likely to earn high grades, which can result in an “I’m Okay” feeling. Matching can aid students to validate themselves by allowing them to discover, accept, or utilize their naturally dominant abilities, creating an “I’m special, too” feeling. And, matching style can promote mental health by helping students to learn with the least stress, to get maximum results from the time invested, and to enjoy a sense of control over their own learning processes. (p. 125)

Along the same line of thought, supporters of the brain lateralization theory cite many disadvantages of mismatching teaching/curricular style with each student’s preferred style. Felder and Henriques (1995), with reference to other supporters, put these disadvantages as follows:

Serious mismatches may occur between the learning styles of students in a class and the teaching style of the instructor (Felder & Silverman 1988; Lawrence 1993; Oxford et al. 1991; Schmeck 1988), with unfortunate potential consequences. The students tend

to be bored and inattentive in class, do poorly on tests, get discouraged about the course, and may conclude that they are no good at the subject of the course and give up (Felder & Silverman 1988; Godleski 1984; Oxford et al. 1991; Smith & Renzulli 1984).
(p. 21)

Despite the fact that the brain lateralization theory is mainly based on studies on split-brain patients, it has gained popularity among educators all over the world. This popularity may be due to the fact that this theory provides a rational basis for individualized instruction; and thus, fits well with the individualization movement which was launched in the USA in the early seventies. But Lefton and Brannon (2003), with reference to Doty (2000), caution that the popularity of this theory is due to its oversimplification and overgeneralization. They state:

There is no doubt that both human beings and other animals exhibit lateralization and specificity of functions. Unfortunately, the popular press and TV newscasters oversimplify the specificity of functions and, in some cases, overgeneralize their significance to account for school problems, marital problems, artistic abilities, and even baseball batting averages. One example in the popular

misconception of hemispheric specialization is that the right hemisphere is “creative.” This belief is an overgeneralization from the right hemisphere’s abilities in spatial visualization and drawing. The right hemisphere is better at drawing, but not necessarily more creative than the left; it depends on the task. For example, the right hemisphere is not capable of creative writing, and both hemispheres must work together to produce poetry—the left hemisphere must find the words and the right hemisphere must construct the meter. Typically, the two hemispheres work together in everyday tasks; for example, the left side of the brain may recognize a stimulus, but the right side is necessary to put that recognition into context (Doty, 2000). (p. 63)

The social-cognitive theory: In his social-cognitive theory, Bandura (1986, 1991, 1997, 1999, 2001) points out that observed behavior, personal factors (such as cognitive styles) and environmental factors (such as peers) play a constant role in the development and modification of behavior, which in turn creates changes in environmental and personal factors. This principle is termed triadic reciprocal determinism. For Bandura, this term means that the foregoing three elements interact with and influence one another.

According to him, learning takes place from observing others and imitating their behaviors and observational learning affects the development of people's thoughts, cognitions and beliefs, which in turn influence their overt behavior.

Along with observational learning, Bandura places special emphasis on the roles of self-evaluation and self-efficacy as mechanisms of behavior. In his view, the performance of an observed behavior is strongly affected by the consequences that happen or might happen to the model or to the observer. He believes that people may observe a variety of behaviors but actively decide whether or not to perform them on the basis of evaluation of the consequences of these behaviors. Therefore, the actual performance of behavior depends on the person's estimation that the imitation of this behavior will lead to the desired outcomes. In this sense, most of people's behavior, according to Bandura, is motivated and regulated by self-evaluative reactions to their own actions. Bandura also argues that self-efficacy determines the types of behavior people will engage in, how much effort they will expend on activities, how long they will persist on challenging tasks, the amount of risk they will take and the types of strategies they will use to achieve success. He further argues that the acquisition of high or low

efficacy expectations depends on performance accomplishments, vicarious experiences, verbal persuasion and states of emotional arousal and that increases in perceived self-efficacy are associated directly with improvement in actual cognitive and behavior skills.

In summary, both the brain lateralization theory and the social-cognitive theory take contradictory positions with regard to cognitive/learning styles and their relationship to the environment. The brain lateralization theory argues that these styles, as much as other personal characteristics, are inherited; and therefore, resistant to change over time. It further argues that the environment can play only a supportive role in the scope of these genetically coded styles. In view of this, the adherents of this theory suggest matching the learning environment to each student's dominant style. They also suggest assigning students to homogeneous cognitive/learning style groups to allow them to learn easily and efficiently without cognitive conflicts. They further claim that differences in cognitive style between individuals in a group cause problems of communication and understanding, which in turn produce difficulties for collaboration and cohesion. As Witkin (1973) states:

[P]ersons of the same style use similar modes of communication and that this, in turn, facilitates understanding ...with positive consequences for their ability to get along with each other. ...It seems that persons of the same cognitive style "emit" similar signs. To the extent that this puts them on the same "wave length," it is reasonable that they should do better with each other. It seems equally reasonable that communication should be less effective between persons of contrasting cognitive style, making for greater difficulty in getting along. (p. 39-41)

The social-cognitive theory, in contrast, takes the position that cognitive/learning styles, as other personal factors, can be reshaped and remolded as a result of the mutual influence among personal factors, observed behavior and the social environment. This mutual influence makes it possible to change cognitive/learning styles over time although they have an innate component. In view of this, the adherents of this theory (e.g., Ben-Ari, 1997; Driver, 2003; Romero-Simpson, 1995; Vengopal and Mridula, 2007; Volkema and Gorman, 1998) argue that heterogeneous cognitive/learning style grouping can be effective for developing and modifying students' non-preferred style as well as their learning

performances because group members with diverse cognitive/learning styles display new behaviors to each other, which can subsequently lead to change in their personal traits, abilities, and beliefs. They further argue that if socio-cognitive conflicts arise among heterogeneous group members, they can be diminished through interaction, which in turn leads to the development of their learning styles as well as their achievement performances.

Research Related to the Study

This section overviews two areas of research related to the present study. These two areas are: (1) stability/instability of cognitive/learning styles, and (2) matching/mismatching teaching strategy/style with cognitive/learning style. In the first area, some studies indicate that cognitive/learning styles are stable across situations and/or cultures over time (e.g., Brody, 1972; Clapp, 1993; Claxton and Ralston, 1978; Cornett, 1983; Diamond, 1977; Honey and Mumford, 2000; Kirton, 1998; Kolb, 1976; Kubes, 1998; Murdock, Isaksen and Lauer, 1993; Oreg, 2003; Oreg et al. 2008; Sadler-Smith, Spicer and Tsang, 2000; Swailes and Senior, 1999; Tullett, 1995, 1997; Veres, Sims and Locklear, 1991), whereas other studies indicate that such styles are malleable and changeable in response to environmental conditions (e.g., Butler and Pinto-Zipp, 2005; Jangaiah, 1998; Messick, 1984; Pask, 1976; Pinto, Geiger

and Boyle, 1994; Price, 1980; Reynolds and Torrance, 1978; Streufert and Nogami, 1989; Tucker, 2007; Volet, Renshaw and Tietzel, 1994). In the second area, some studies show that learners perform better when they are taught in their preferred style (e.g., Barber, Carbo and Thomasson, 1998; Brooks, 1991; Ford, 1995; Lenehan, Dunn, Ingham, Murray and Signer, 1994; Miller, 1998; Skipper, 1997; Spires, 1983), whereas other studies show that learners perform better when the instructor's teaching strategy/style mismatch their preferred cognitive/learning style. (e.g., Kowoser and Berman, 1996; O'Brien and Thompson, 1994; Rush and Moore, 1991; Vaughan and Baker, 2001). For reviews of research in this second area, see Doyle and Rutherford (1984), Hayes and Allinson (1996), Nicholls (2002), Pithers (2002) and Robotham (2000).

It appears then that the findings of the previous research in the two areas related to the present study are contradictory. These confusing findings might be attributable to the differences in the conditions under which these studies were conducted such as the length, material, source, field, type and place of instruction. These contradictory findings might also arise from the non-control of the extraneous factors such as gender, age, socioeconomic status and grade level, which could affect the dependent variable(s) in these

studies. It also appears from the previous research that no studies have investigated the effects of homogeneous versus heterogeneous cognitive style grouping within-class on students' non-preferred reading style and reading comprehension. In sum, the inconclusive findings from the research literature, together with the paucity of studies that incorporate the lateralization theory and the social cognitive theory into group work in the area of reading, warrant this study.

Hypotheses of the Study

This study aimed at testing the following null hypotheses at the 0.05 alpha level:

- 1. There is no statistically significant difference in the posttest-adjusted mean scores of students' non-preferred reading style between the homogeneous reading-style group and the heterogeneous reading-style group.**
- 2. There is no statistically significant difference in the posttest-adjusted mean scores of students' reading comprehension between the homogeneous reading-style group and the heterogeneous reading-style group.**

Operational Definition of Terms

The terms below, wherever seen in this study, have these definitions:

The term 'homogeneous reading-style grouping' refers to a way of grouping in which students of the same reading style are assigned to pair groups (analytic with analytic and global with global) within the same class.

The term 'heterogeneous reading-style grouping' refers to a way of grouping in which analytic and global students are mixed together in pairs (one from each) within the same class.

The term 'preferred reading style' refers to the strongly favored way of processing (perceiving, interpreting and retaining) text information. In the present study, this strongly favored way is designated by scores above 75 out of a possible 100 on one of the two sections of the Analytic/Global Reading Styles Inventory.

The term 'non-preferred reading style' refers to the slightly favored way of processing (perceiving, interpreting and retaining) text information. In the present study, this slightly favored way is designated by scores below 50 out

of a possible 100 on one of the two sections of the Analytic/Global Reading Styles Inventory.

The term 'dual reading style' refers to the way of processing (perceiving, interpreting and retaining) text information both analytically and globally. In the present study, this dual way is designated by scores above 75 out of a possible 100 on the two sections of the Analytic/Global Reading Styles Inventory.

The term 'reading comprehension' refers to both referential and inferential comprehension of text information, as measured by the Reading Comprehension Test developed by the researcher.

Method

Subjects

The original subjects for the study were 86 English major senior students in Suez Faculty of Education at Suez Canal University during the 2005/2006 academic year. All of them were Arabic native speakers and predominantly female with only four male students. All had a mean age of 21 years, plus or minus 0.5 months and were nearly of the same socioeconomic status with

respect to their parents' monthly income. Of these original subjects and based upon the Analytic/Global Reading Styles Inventory scores, 24 students were eliminated from the study because seven of them had strong preference for both analytic and global styles and seventeen were found to be moderately analytic and/or moderately global learners. The researcher chose only strong analytic and strong global subjects to participate in the study. Each of these participants scored above 75 on one of the two sections of the inventory and below 50 on the other. These selected subjects (N=62) were randomly assigned to a homogeneous or heterogeneous group. In the two groups, subjects were further assigned to pairs, ensuring that the groups were balanced for sex to eliminate the possible confounding effects of gender. Table 1 below shows the composition of each group.

Table 1

Distribution of Participants by Reading Style to Groups and Pairs

Group	Style(s) of Pairs	No. of Pairs	No. of Students
Homogeneous	Analytic/Analytic	8	32
	Global/Global	8	
Heterogeneous	Analytic/Global	15	30

Instruments

To achieve the aims of the study the researcher developed an Analytic/Global Reading Styles Inventory and a Reading Comprehension Test as indicated below.

The Analytic/Global Reading Styles Inventory

The researcher developed an Analytic/Global Reading Styles Inventory (see Appendix) based on the characteristics of the analytic and global learners agreed upon in most of the cognitive style literature. However, this inventory differs from the existing ones in that the existing inventories regard analytic and global styles as a single dimension or two points at the end of a continuum, whereas this inventory regards them as two dimensions to allow the researcher to eliminate dual cognitive style (bicognitive) learners, if any exist, before the start of the experiment and to measure improvement in the non-preferred style with the end of the study. This contention is supported by the researchers who found that a significant number of the subjects in their pilot studies was predominantly stronger in two styles. Gaden (1992), for example, found that 56% of 147 physical therapy students in four programs revealed a 'dual' learning style. Coker (2000), for another

example, found that 58% of the athletic students in her study were bicognitive style learners.

The purpose of the inventory is to identify students with strong analytic and those with strong global reading styles before the beginning of the study and to measure their non-preferred reading style before and after the experiment. The inventory consists of 40 Likert-scale items which are categorized into two sections (20 items for each). The first section measures the analytic reading style and the second measures the global one. Both sections give information about what students like to do before, during, and after reading. This type of thinking may go against some personality theorists, but it agrees with many educators' and psychologists' point of view that cognitive processes occur at the pre-, while-, and post-reading stages (Birnbaum, 1986; Brunk-Chavez, Shaffer, Varela, Storey-Gore and Meeuwsen, 2008; Janus and Bever, 1985) and that these processes are reflections and indicators of cognitive styles (Chinien and Boutin, 1993; Garity, 1995; Gul, 1987; Kerka, 1986; Kogan, 1971; McKay, Fischler and Dunn, 2003; Messick, 1976, 1987, 1994), which in turn characterize actual behavior (Chakraborty, Hu and Cui, 2008; Gray, 1976; Kirton, 1976; Witkin, Moore, Goodenough and Cox, 1977).

The inventory is based on a scale ranging from 1 to 5, with the score of 1 indicating 'least preferred' and 5 indicating 'most preferred'. In each section, the total score ranges from 20 to 100, with scores above 75 indicating 'strong preference,' scores from 50 to 75 indicating 'moderate preference,' and scores below 50 indicating 'slight preference.'

To establish the validity of the inventory, two pilot studies were conducted. In the first study, the researcher asked ten English major senior students to read this inventory and to underline the difficult words and items they did not understand immediately. After that, the researcher changed the difficult words and items they underlined and made sure that the new words and items could be understood quickly by the ten participants. In the second pilot study, the inventory was given to a jury of four university professors (two from the Department of Psychology and the other two from the Department of Curricula and Instruction) to evaluate each item in terms of its construct. They all indicated that each item in the inventory measures what it is supposed to measure.

To estimate the internal consistency reliability of the inventory, the researcher administered it to 40 English major senior students who were not

part of the study and the Cronbach's alpha coefficient was calculated for each section. These coefficients were found to be 0.78 for the first section and 0.83 for the second section, which indicated that the items in each section were highly consistent.

The Reading Comprehension Test

Four previously-unseen reading passages with twenty questions (5 for each) were used as the pre-posttest to measure each student's reading comprehension before and after the experiment. The questions called for both analytic and global thinking. Ten of them were analytic and the other ten were global. To establish its validity, the Reading Comprehension Test was administered to four university professors (two from the Department of English and the other two from the Department of Curricula and Instruction) to give their opinions of its level, timing, instructions and layout. They indicated that the level and the timing were appropriate, the instructions were understandable, and the layout was neat. To ensure its reliability, the test was administered to a sample of 40 English major senior students out of the participants of the study, and was readministered ten days later to the same sample to assess its stability over time. The Pearson

correlation coefficient between scores on the two occasions was found to be 0.85 ($p < 0.01$, two tails), which indicates a good level of reliability.

Materials for the Study

The materials for the study were twenty eight reading passages. These passages were adapted from various sources, including books, magazines and newspapers. All these passages had not been read by the subjects prior to the onset of the study. Each passage consisted of two long paragraphs followed by six questions. These questions focused on either analytic or global reading skills for the homogeneous group, depending on matching the preferred style of each subgroup, and on both analytic and global reading skills (3 for each) for the heterogeneous group.

In order to establish the validity of these materials they were given to two university professors from the Department of English to provide their opinions about the level of the reading passages and the skills measured by the questions after each passage. The researcher took their opinions into his consideration and modified the reading passages as well as the questions accordingly.

Variables of the Study

The independent variable in the study was within-class reading style grouping with two levels (homogeneous and heterogeneous). In the homogeneous grouping condition, students were randomly placed into pairs of the same reading style (either global or analytic), whereas in the heterogeneous grouping condition, students were placed into pairs by randomly selecting one student from each of the two reading styles (analytic and global). In both conditions, the members of each pair alternatively exhibited their reading behaviors by thinking aloud while reading and sharing answers to post-passage questions after reading. In each session members of each pair alternatively read the first paragraph of the passage and thought aloud while reading. One pair member then served as a recaller of the information without looking at the passage and the other member served as a listener and detected errors and omissions in his/her partner's recall. After that, both members read the second paragraph of the passage and switched roles. Finally, each member independently answered the six questions after the passage and shared answers with the other member. Meanwhile, the teacher (researcher) served as a consultant for all pairs in each group. He also moved from pair to pair to ensure that students did not work with members of other pairs or engage in off-task talk.

The dependent variables in the study were: (1) students' non-preferred reading style, as measured by the Analytic/Global Reading Styles Inventory, and their (2) reading comprehension, as measured by the reading comprehension pre-posttest. To eliminate the effects of extraneous variables on these dependent variables, gender and socioeconomic status of students were controlled in both groups of the study. Both groups were also monitored by the same teacher (researcher) during two different, yet similar morning sessions. Moreover, the researcher used the statistical analysis of covariance to control for the initial differences between the two groups in the non-preferred reading style and reading comprehension scores.

For data analysis with SPSS, the dependent variable was the scores on the posttest, the fixed factor was the homogeneous and heterogeneous groups and the covariate was the scores on the pretest.

Procedures of the Study

At the beginning of the academic year 2005/2006, the Analytic/Global Reading Styles Inventory (AGRSI) was administered to the original subjects of the study to measure each student's analytic and global reading styles, Afterwards, based on the classification scheme of the inventory on the one

hand and the difference between the analytic and global scores of each student on the other hand, the researcher selected only strongly analytic and strongly global subjects, who were not dual reading style (bicognitive) learners, to participate in the study. Thereafter, these selected subjects (N=62) were randomly assigned to homogeneous (analytic/analytic and global/global) or heterogeneous (analytic/global) group. Within each group, students were then randomly placed into pairs. Following this, the Reading Comprehension Test was administered to both groups to measure each student's reading comprehension before conducting the experiment. After that, the participants were instructed on how to read collaboratively in pairs and how to think aloud while reading, depending on the preferred reading style of each group/subgroup. Each pair then worked together for 28 weeks, one session per week. Each session lasted for ninety minutes. At the end of the study, the AGRSI and the Reading Comprehension Test were again given to both groups to measure each student's non-preferred reading style and reading comprehension. Finally, the differences in the posttest-adjusted mean scores between the two groups were analyzed for significance using ANCOVA.

Design of the Study

The design of this study was a pretest-posttest experimental one. In this design, the researcher randomly assigned strongly analytic and strongly global subjects to homogeneous or heterogeneous group. He then measured each student's non-preferred reading style and reading comprehension using the AGRSI and the Reading Comprehension Test. After treatment, the same tests were readministered to both groups to measure each student's non-preferred reading style and reading comprehension. This design is displayed in Table 2 below.

Table 2

Design of the Study

Homogeneous Group	01	02	X1	01	02
Heterogeneous Group	01	02	X2	01	02

Where:

01= Analytic Global Reading Styles Test

01= Reading Comprehension Test

X1= Reading in homogeneous pairs

X2= Reading in heterogeneous pairs

Data Analysis

Data analysis was carried out to determine whether there was a statistically significant difference between the mean scores of the two groups in each of the two dependent variables after the effect of the covariate was removed. Before the comparison of the adjusted mean scores of the two groups, assumptions of homogeneous regression coefficients and linearity of Y on X were examined and found to be appropriately met. Furthermore, along with ANCOVA analysis, the researcher made sure that the Levene's test of homogeneity of variance is significant at the 0.05 level or greater for both the non-preferred reading style and reading comprehension [$f(1, 60)=55.391$, $p < 0.001$; $f(1, 60)= 9.978$, $p=0.002$, respectively].

Findings and Discussion

(1) ANCOVA Results for the First Hypothesis

The posttest-adjusted mean scores of students' non-preferred reading style were 27.66 with a standard deviation of 7.25 for the homogeneous group and 39.87 with a standard deviation of 11.56 for the heterogeneous group. To examine the difference between these adjusted means, an analysis of

covariance was employed using the General Linear Model (GLM) procedure of SPSS. The results of this ANCOVA are reported in Table 3 below.

Table 3

**Results of ANCOVA for the Non-Preferred Reading Style Scores
with Partial Eta Squared and Observed Power**

Dependent Variable: Posttest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power
Corrected Model	5417.863	2	2708.931	66.667	0.000	0.693	1.000
Intercept	69.694	1	69.694	1.715	0.195	0.028	0.252
Pretest	3109.306	1	3109.306	76.521	0.000	0.565	1.000
Group	2451.434	1	2451.434	60.330	0.000	0.506	1.000
Error	2397.379	59	40.634				
Total	77663.000	62					
Corrected Total	7815.242	61					

a. Computed using alpha = 0.05

b. R Squared = 0.693 (Adjusted R Squared =0.683)

c. Levene's Test of Equality of Error Variances: $f(1, 60)=55.391, p < 0.001$

As indicated in Table 3, a statistically significant difference in the adjusted mean scores of students' non-preferred reading style, as measured by the AGRSI, was found between the homogeneous group and the heterogeneous group in favor of the latter group [$f(1, 59)= 60.33, p < 0.001$, with large effect size (partial Eta-squared=0.506)]. Therefore, the first null hypothesis

was rejected. This finding could be attributable to seven reasons. The first reason is that the lifelong ability of the normal human brain to reorganize itself and to learn new functions coupled with the heterogeneous social environment, which exhibited the behavior of these functions, could have enabled both analytic and global students who worked together in this environment to reorganize their own brains forming new connections with the non-dominant hemisphere, which could in turn make it work efficiently. In line with this explanation stands the fact that the human brain's structure and functions are subject to change throughout a person's lifetime because of the plasticity of the brain (Doidge, 2007). This plasticity provides the basis for learning a wide range of new functions and new styles even through adolescence. Support for this fact comes Lefton and Brannon (2003) in the following way:

Culture and environment affect behavior, and individuals are capable of change throughout their lives. Over time individuals develop new, different connections among brain cells that did not exist at birth. Furthermore, connections that existed at birth and in childhood may have disappeared. Basically, adult brains are not only capable of reorganizing themselves, but do so throughout a

person's lifetime. Our brains are constantly being organized and reorganized forming new and useful connections. (p. 45)

Further support for the same fact comes from research on brain plasticity, as summarized by Bernstein, Penner, Clarke-Stewart and Roy (2006) in the following:

The brain continues to mature even through adolescence, showing evidence of ever more efficient neural communication in its major fiber tracts (Gotay et al. 2004; Paus et al., 1999; Thompson et al., 2000). ...Throughout the life span, the brain retains its plasticity, rewiring itself to form new connections and to eliminate connections, too (Hua & Smith, 2004). Our genes apparently determine the basic patterns of growth and major lines of connections –the “highways” of the brain and its general architecture. ... But the details of the connections depend on experience, including the amount of complexity and stimulation in the environment. ...In any event this line of research highlights the interaction of environmental and genetic factors. ...Within constraints set by genetics, interactions with the world mold the brain itself (e.g., Chang & Merzenich, 2003). (pp. 89-90)

A second reason, closely related to that just given, for the better improvement of the heterogeneous group students' non-preferred reading style is that the novelty and richness of the social cognitive environment, in which both analytic and global students worked together throughout the experiment, could have led to the generation of new neurons and new synapses, that allowed for fresh neural and synaptic connections in their brains and acted to develop the non-dominant hemisphere functions, thereby enabling students to develop style flex-abilities and to use both sides of the brain efficiently. In support of this reason, neuroscience research affirms that the elaboration and reorganization of the brain are predisposed to occur when organisms are placed in superenriched environments (e.g., Elkind, 1999; Kempermann, Gast and Gage, 2002). It also affirms that the formation of new neurons and new synapses occurs in the adult human brain in response to new experiences (e.g., Steindler and Pincus, 2002).

A third reason for the greater improvement of the heterogeneous group students' non-preferred reading style is that the observation and imitation of the non-preferred reading style behavior in the heterogeneous group could have stimulated students' corpus callosums more fully to form extra-

extensive connections between the left and right hemispheres, which could in turn activate the brain as a whole and achieve whole brain functioning, thereby enhancing the non-dominant hemisphere functions and developing the underdeveloped reading style. In support of this reason, subordinate data analyses of the pretest and posttest scores for analytic and global subjects in the heterogeneous group, using the paired samples t-test, show that analytic subjects became significantly more global than previously and global subjects became significantly more analytic than previously ($t=9.48$, $df=14$, $p < 0.001$; $t=7.66$, $df=14$, $p < 0.001$, respectively), whereas neither analytic nor global subjects in the homogeneous group significantly improved their non-preferred reading style ($t = -1.00$, $df=15$, $p=NS$; $t = 0.00$, $df=15$, $p=NS$, respectively).

A fourth reason is that the observation and imitation of the behavior that requires the non-dominant hemisphere activity in the heterogeneous group might have led to stimulating the resting neurons in this hemisphere over and over again, causing them to branch out and become faster and easily accessible, thereby improving the functions of this hemisphere and making them easier and preferable to read with. A fifth reason is that both analytic and global students in the heterogeneous group might have realized the

usefulness of the non-dominant style for reading comprehension. Thereby, they deliberately chose to exercise and apply it, which could in turn result in its development and in the extension of its use to an ever-widening range of reading activities.

A sixth reason is that the frequent observation of the non-preferred reading style behavior in the heterogeneous group might have awakened students' unconscious minds, which could in turn lead them to control the non-dominant hemisphere functions, consider the alternative reading style according to the requirements of the task and to invest extra conscious effort in improving their underdeveloped reading style while continuing to use their developed one. A final reason is that students in the heterogeneous group were more likely to observe and imitate each other's behavior because they had different but complementary styles. This could subsequently raise their feeling of efficacy and motivate them to employ the non-dominant hemisphere and to fortify its functioning. On the opposite side, students in the homogeneous group did not have the opportunity to watch or imitate new reading behaviors, thereby remaining stable in their stylistic comfort zone, which in turn fostered their stereotypical reading style. In line with this explanation, Hayes and Allinson (1998) note that homogeneous grouping

leads to the formation of a shared mental model that fosters stereotypical thinking. Confirming this, Leonard and Sensiper (1998) state: “If all individuals in the group approach a task with highly overlapping experiential backgrounds, they may be subject to ‘groupthink,’ i.e., a comfortable common viewpoint leading to closed mindedness and pressures toward uniformity” (p. 118).

(2) ANCOVA Results for the Second Hypothesis

The posttest-adjusted mean scores of students’ reading comprehension were 10.44 with a standard deviation of 2.9 for the homogeneous group and 13.50 with a standard deviation of 2.0 for the heterogeneous group. To examine the difference between these adjusted means, an analysis of covariance was employed using the General Linear Model (GLM) procedure of SPSS. The results of this ANCOVA are reported in Table 4 below.

Table 4

**Results of ANCOVA for Reading Comprehension Scores
with Partial Eta Squared and Observed Power**

Dependent Variable: Posttest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power
Corrected Model	331.885	2	165.943	46.910	0.000	0.614	1.000
Intercept	20.409	1	20.409	5.769	0.019	0.089	0.656
Pretest	186.664	1	186.664	52.767	0.000	0.472	1.000
Group	152.762	1	152.762	43.184	0.000	0.423	1.000
Error	208.711	59	3.537				
Total	9349.000	62					
Corrected Total	540.597	61					

a. Computed using alpha = 0.05

b. R Squared = 0.614 (Adjusted R Squared = 0.601)

c. Levene's Test of Equality of Error Variances: $f(1, 60) = 9.978, p = 0.002$

As indicated in Table 4, a statistically significant difference in the adjusted mean scores of students' reading comprehension, as measured by the reading comprehension pre-posttest, was found between the homogeneous group and the heterogeneous group in favor of the latter group [$f(1, 59) = 43.184, p < 0.001$, with large effect size (partial Eta-squared=0.423)]. Therefore, the second null hypothesis was rejected. This finding could be attributable to three reasons. The first reason is that the flexible use of reading styles and the utilization of both the left and right hemispheres of the brain by the heterogeneous group students throughout the experiment

might have enabled them to process different sorts of information and to use both the bottom-up and top-down processes simultaneously and alternatively, which could in turn enrich their experiences and result in developing their reading comprehension. In line with this explanation, research indicates a high degree of interdependence between comprehension and decoding abilities (e.g., Baumann and Kameenui, 1991; Beck, Prefetti and McKeown, 1982; Daneman, 1988; Golinkoff and Rosinski, 1976; Gough, 1984; Stanovich, 1986; Tunmer and Hoover, 1992; Tunmer, Nesdale and Wright, 1987; Vellutino and Scanlon, 1991). A second reason for the better improvement of the heterogeneous group students' reading comprehension is that their self-efficacy might have been enhanced because the analytic student and the global student had much to learn from each other and each turned to the other for assistance and guidance, leading to higher expectations of efficacy, which could in turn motivate them to learn new reading behaviors and improve their reading comprehension. In line with this reason, Lehman (2007) notes that grouping can result in higher performance if students strengths are complementary. In a complementary vein, Hayes and Allinson (1997) contend that exposing learners to activities that mismatch their preferred learning style will develop the learning competencies necessary to cope with different and complex learning

situations. A third reason for the higher gain achieved by the heterogeneous group students on the reading comprehension pre-posttest is that the interaction between analytic and global students might have developed their higher-level thinking skills, which could positively affect their reading comprehension. In support of this, Doise and Hanselman (1991) have found “sociocognitive conflict” to be “a very efficient way of generating cognitive progress” (p. 119). O'Connor, Gruenfeld and McGrath (1993) have also found that high levels of group conflict yield better task performance than does low conflict. On the opposite side, the homogeneous group students were unlikely to gain or exchange experiences that could enhance their sense of efficacy or improve their reading comprehension. Moreover, their over-reliance on only one reading style might have limited their cognitive processes and narrowed their thinking, which could in turn hinder much improvement of their reading comprehension. Along with this explanation, Urquhart and Weir (1998) state:

Over-reliance on either top-down or bottom-up processing to the neglect of the other may hamper readers; efficient and effective second language reading requires both top-down or bottom-up strategies in different combinations for different purposes (Carrell, 1988: 240-1; Rumelhart, 1977, 1980). For example, it would be

mistaken only to rely on word by word bottom up processing in a skimming exercise designed to extract quickly the gist from a text. However, some careful processing of textual clues to overall meaning might be necessary once these are located through more expeditious strategies. (p. 188)

In support of the same reason, subordinate data analyses of the pretest and posttest scores for analytic and global subjects, using the paired samples t-test, show that both analytic and global subjects in the heterogeneous group significantly improved their reading comprehension ($t=11.25$, $df=14$, $p < 0.001$; $t=9.53$, $df=14$, $p < 0.001$, respectively). This indicates that both analytic and global students benefited from heterogeneous grouping.

Overall, this study indicates that cognitive/learning styles are a key factor in the success of within-class group work. It shows that heterogeneous reading-style grouping is more effective in developing EFL students' non-preferred reading style and reading comprehension than homogeneous reading-style grouping. These results suggest that the non-preferred reading style can be developed through observation and imitation when students learn with and from others with different reading styles. In support of this conclusion, in

her review of the main trends in cognitive style research, Kozhevnikov (2007) reports the following:

[S]tudies also made it clear that cognitive styles are not simply inborn structures, dependent only on an individual's internal characteristics, but rather, are interactive constructs that develop in response to social, educational, professional and other environmental requirements. (p. 476)

In light of the foregoing, one of the goals of reading comprehension instruction should be developing students' non-preferred reading style without neglecting their preferred one or forcing students to rely completely on their non-preferred style. This enables them to balance both sides of the brain and achieve whole brain functioning. It also enables them to gain new skills, which in turn improve their non-preferred reading style and reading comprehension. In line with this, following a review of the literature on cognitive learning styles, Pithers (2002) reports the following:

Teachers and their students need to be taught to adopt a flexible approach to cognitive style attitudes, thinking and behaviour. All individuals in education and training need to be able to develop self-awareness about themselves in terms of any preferred cognitive

style characteristics..., but then be able to select the information processing approach...which best suits the new problem or situation. (p. 129)

Claxton and Murrell (1988) have made a similar observation in the following way:

Matching is particularly appropriate in working with poorly prepared students and with new college students, as the most attrition occurs in those situations. Some studies show that identifying a student's style and then providing instruction consistent with that style contribute to more effective learning. In other instances, some mismatching may be appropriate so that students' experiences help them to learn in new ways and to bring into play ways of thinking and aspects of the self not previously developed. Any mismatching, however, should be done with sensitivity and consideration for students, because the experience of discontinuity can be very threatening, particularly when students are weak in these areas. (p. 2)

The results of the study also suggest that both bottom-up and top-down processes are important for reading comprehension. One of them could not compensate for the shortcomings of the other. Without bottom-up processing, the reader may be fooled or misled by his/her own experiences, and without top-down processing the reader cannot understand the text as a whole. In other words, reading comprehension is jointly achieved by both what is in the text and what is happening in the reader's mind. In support of this conclusion, Aslanian (1985) concludes from her study: "If readers rely too heavily on their knowledge and ignore the limitations imposed by the text, or vice versa, then they will not be able to comprehend the intended meaning of the writer" (p. 20). The same conclusion is also supported by Mynatt and Doherty (2002) in the following way:

One of the most powerful impulses that accompany the human need to understand is the impulse to analyze, to break what one is trying to understand into its parts. But analysis is only one part of the story. Synthesis is equally important. We must also know how the parts go together before we understand the whole. (p. 98)

In short, the findings of this study cast doubt on the stability of reading styles and show that group work is more effective in corporation with the social cognitive theory than with the lateralization theory.

Limitations of the Study

The generalizability of the findings of this study is limited to the size of its participants. It is also limited to analytic and global reading styles and the inventory used for measuring these styles. The researcher investigated only these two styles because they are most important to reading comprehension and encompass most of the other learning styles, a belief shared by Oxford and Anderson (1995) Oxford, Ehrman and Lavine (1991) and Schmeck (1988). The generalizability of the findings of this study is also limited to pair work within homogeneous and heterogeneous groups to give members of each pair an equal opportunity to observe and imitate each other's reading behaviors.

Recommendations of the Study

Based on the findings of this study and within its limitations, the researcher offers the following recommendations:

- (1) Reading teachers should stop passing on bits and pieces of information to their students and engage them, instead, in learning through interaction with each other. They should also take heterogeneous grouping into their own considerations in the process of forming groups to maximize the benefits of group work. The implementation of this recommendation requires fixed classroom furniture to be removed and replaced with easily movable tables and chairs that offer possibilities for classroom arrangements and group work. It also requires teachers to have frequent knowledge about their students' cognitive/learning styles to assign them to heterogeneous groups in which members can observe and imitate the behaviors of their non-preferred style in a challenging and non-threatening atmosphere without suppressing the preferred one.**
- (2) Reading teachers should provide students with tasks that cater to both analytic and global reading styles because both styles are just like vitamins A and B. One of them cannot make up for the other's deficiency. Each has its own functions which cannot be carried out by the other and students inevitably encounter tasks that require the use of both styles. Therefore, teachers should regard them as complementary cognitive elements that can be used simultaneously and alternatively to achieve comprehension. They should also model the cognitive processes**

of both styles to their students, by thinking aloud while reading to them, to show them how these processes operate interactively.

- (3) Reading teachers should help students develop a strong sense of self-efficacy by giving them the opportunity to assess their own reading styles and to participate more fully in the process of improving their non-preferred style and reading comprehension.
- (4) Students need to reflect not only on what they read, but also on how they read. In so doing, they take a reflective approach to reading which can enable them to revise and modify their own reading styles and to monitor their reading comprehension.
- (5) Students need to be aware of their own preferred and non-preferred reading styles as well as the effects of these styles on comprehension to practice improving their own non-preferred style willingly without neglecting the preferred one.

Suggestions for Further Research

Further research with larger sample sizes is needed to investigate the effect of within-class ability grouping versus cognitive/learning style grouping on students' reading comprehension. It is also important to investigate the effects of homogeneous versus heterogeneous cognitive/learning style

grouping on students' self-efficacy and attitudes towards group mates and reading. In addition, further research studies need to investigate the effects of cognitive versus sociological style grouping on students' reading comprehension. Finally, further research should focus on what reading texts mean to students who belong to different cognitive/learning style groups and how these groups develop interpretations of texts.

References

- Abadzi, H. (1984). Ability grouping effects on academic achievement and self-esteem in a southwestern school district. *Journal of Educational Research*, 77(5), 287-292.
- Alexander, R., Rose, J. and Woodhead, C. (1992). *Curriculum organization and classroom practice in primary schools*. London: HMSO.
- Alfonseca, E., Carro, R., Martin, E., Ortigossa, A. and Paredes, P. (2006). The impact of learning styles on student grouping for collaborative learning: A case study. *User Modeling and User-Adapted Interaction*, 16(3-4), 377-401.
- Aslanian, Y. (1985). Investigating the reading problems of ESL students: An alternative. *ELT Journal*, 39(1), 20-27.
- Ausburn, L., and Ausburn, F. (1978). Cognitive styles: Some information and implications for instructional design. *Educational Communication and Technology*, 26(4), 337-354.
- Bada, E. and Okan, Z. (2000). *Students' language learning preferences*. Available at: <http://www.home.msn.com>. Accessed June 4, 2005.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, 50, 248-287.
- (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- (1999). Social cognitive theory of personality. In L. Pervin and O. John (Eds.), *Handbook of personality: Theory and research* (2nd edition, pp. 154-198). New York: Guilford.
- (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.
- Barber, L., Carbo, M., and Thomasson, R. (1998). *A comparative study of the reading styles program to extant programs of teaching reading*. Bloomington, IN: Phi Delta Kappa.
- Barr, R. (1995). What research says about grouping in the past and present and what it suggests about the future. In M. Radencich and L. McKay (Eds.), *Flexible grouping for literacy in the elementary grades* (pp. 1-24). Boston: Allyn and Bacon.
- Barr, R., Blachowicz, C. and Wogman-Sadow, M. (1995). *Reading diagnosis for teachers: An instructional approach* (3rd edition). London: Longman.
- Bassano, S. and Christison, M. (1988). Cooperative learning in the ESL classroom. *TESOL Newsletter*, 22(2), 7-10.
- Baumann, J. and Kameenui, E. (1991). Research on vocabulary instruction: Ode To Voltaire. In J. Flood, J. M. Jensen, D. Lapp, and J. R. Squire (Eds.), *Handbook of research on teaching the English language arts* (pp. 604-632). New York: Macmillan.
- Beck, I., Perfetti, C. and McKeown, M. (1982). Effects of long-term vocabulary instruction on lexical access and reading comprehension. *Reading Research Quarterly*, 17, 462-481.
- Ben-Ari, R. (1997). Complex instruction and cognitive development. In E. G. Cohen and R. A. Lotan (Eds.), *Working for equity in heterogeneous classrooms: Sociological theory in practice* (pp. 193-206). New York: Teachers College Press.

- Bennett, N. (1998). Managing learning through group work. In C. Desforges (Ed.), *An introduction to teaching: Psychological perspectives* (pp. 150-146). Oxford, UK: Blackwell.
- Bennett, N. and Cass, A. (1988). The effects of group composition on group interactive processes and pupil understanding. *British Educational Research Journal*, 15, 19-32.
- Bennett, N. and Dunne, E. (1991). The nature and quality of talk in cooperative classroom groups. *Learning and Instruction*, 1, 103-118.
- Bernstein, D. Penner, L., Clarke-Stewart, A., and Roy, E. (2006). *Psychology* (7th edition). Boston: Houghton Mifflin Company.
- Birnbaum, J. (1986). Reflective thought: The connection between reading and writing. In B.T. Peterson (Ed.) *Convergences: Transactions in reading and writing* (pp. 30-45). Urbana, IL: National Council of Teachers of English.
- Bonham, L. (1989). Using learning style information, too. In E. R. Hayes (Ed.), *Effective teaching styles*. (New Directions for Continuing Education, No. 43). San Francisco: Jossey-Bass.
- Braddock, J. and Slavin, R. (1993). Why ability grouping must end: Achieving excellence and equity in American education. *Journal of Intergroup Relations*, 20(1), 51-64.
- Brody, N. (1972). *Personality research and theory*. New York: Academic Press.
- Brooks, J. D. (1991). *Teaching to identified learning styles: The effects upon oral and silent reading and listening comprehension*. Doctoral Dissertation, University of Toledo.
- Brown, A. and Palincsar, A. (1989). Guided, cooperative learning and individual knowledge acquisition. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Brunk-Chavez, B., Shaffer, N., Varela, S., Storey-Gore, T, and Meeuwsen, H. (2008). *Professional development modules project in reading comprehension*. Available at: <http://works.bepress.com/cgi/viewcontent.cgi?article=1014&context=beth>. Accessed December 6, 2008.
- Butler, K. (1988). *Learning and teaching style: In theory and practice* (2nd edition). Columbia, CT: The Learner's Dimension.
- Butler, T. and Pinto-Zipp, G. (2005). Students' learning styles and their preferences for online instructional methods. *Journal of Educational Teaching Systems*, 34(2), 199-221.
- Carrier, C. and Sales, G. (1987). Pair versus individual work on the acquisition of concepts in a computer-based instructional lesson. *Journal of Computer-Based Instruction*, 14, 11-17.
- Chakraborty, I., Hu, P. and Cui, D. (2008). Examining the effects of cognitive style in individuals' technology use decision making. *Decision Support Systems*, 45(2), 228-241.
- Chinien, C. and Boutin, F. (1993). Cognitive style FD/I: An important learner characteristic for educational technologists. *Journal of Educational Technology Systems*, 21(4), 303-311.
- Chorzempa, B. and Graham, S. (2006). Primary-grade teachers' use of within-class ability grouping in reading. *Journal of Educational Psychology*, 98, 529-541.
- Clapp, R. (1993). The Stability of cognitive style in adults: A longitudinal study of the KAI. *Psychological Reports*, 73(3), 1235-1245.

- Claxton, C. and Murrell, P. (1988). *Learning styles*. Available at: http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage.../d2.pdf. [ED301143].
- Claxton, S., and Ralston, Y. (1978). *Learning styles: Their impact on teaching and administration*. Washington D.C.: American Association for Higher Education. (Higher Education Report, No. 10).
- Coakes, S. and Steed, L. (2003). *SPSS: Analysis without anguish: Version 11.0 for Windows*. Brisbane: John Wiley.
- Coker, C. (2000). Consistency of learning styles of undergraduate athletic training students in the traditional classroom versus clinical setting. *Journal of Athletic Training*, 35(4), 441-444.
- Cooper, C., Marquis, A. and Edward, D. (1986). Four perspectives on peer learning among elementary school children. In E. C. Mueller and C. R. Cooper (Eds.), *Process and outcome in peer relationships* (pp. 269-300). New York: Academic Press.
- Cornett, C. (1983). *What you should know about teaching and learning styles*. Bloomington, IN: Phi Delta Kappa Educational Foundation.
- Daneman, M. (1988). Word knowledge and reading skill. In M. Daneman, G. MacKinnon and T. G. Walker (Eds.), *Reading research: Advances in theory and practice* (pp. 145-175). San Diego: Academic.
- Dansereau, D. (1987). Transfer from cooperative to individual studying. *Journal of Reading*, 30, 614-619.
- Davey, B. (1990). Field dependence-independence and reading comprehension questions: Task and reader interactions. *Contemporary Educational Psychology*, 15, 241-250.
- Diamond, L. (1977). *Resistance to change: Relationship of personality and cognitive ability to innovation diffusion process*. Available at: <http://www.eric.ed.gov/> [ED146561].
- Doidge, N. (2007). *The brain that changes itself: Stories of personal triumph from frontiers of brain science*. New York: Viking Adult.
- Doise, W. and Hanselmann, C. (1991). Conflict and social marking in the acquisition of operational thinking. *Learning and Instruction*, 1, 119-127.
- Doyle, W. and Rutherford, B. (1984). Classroom research on matching learning and teaching styles. *Theory into Practice*, 23(1), 20-25.
- Driver, M. (2003). Diversity and learning in groups. *The Learning Organization: An International Journal*, 10(3), 149-166.
- Dunn, R. and Dunn, K. (1993). *Teaching secondary school students through their individual learning styles*. Boston: Allyn and Bacon.
- (1999). *The complete guide to the learning styles of inservice system*. Boston: Allyn and Bacon.
- Elkind, D. (1999). Authority of the brain. *Developmental and Behavioral Pediatrics*, 20(6), 432-433.
- El-Samaty, M. (2000). *Coping with a large class size*. Paper presented at the Second Annual Convention of Egyptesol, Cairo, Egypt, November 3-5, 2000.
- Emmer, E., Evertson, C. and Worsham, M. (2000). *Classroom management for secondary teachers* (5th edition). Boston: Allyn and Bacon.
- Fandt, P., Cady, S. and Sparks, M. (1993). The Impact of reward interdependency on the synergogy model of cooperative performance: Designing an effective team environment. *Small Group Research*, 20(1), 101-115.

- Feeney, J. (1992). Oh, to fly with the bluebirds...Looking back on tracking. *Schools in the Middle*, 2(1), 38-39.
- Felder, R. and Henriques, E. (1995). Learning and teaching styles in foreign and second language education. *Foreign Language Annals*, 28(1), 21-31.
- Fiedler, E., Lange, R. and Winebrenner, S. (1993). In search of reality: Unraveling the myths about tracking, ability grouping, and the gifted. *Roeper Review*, 16(1), 4-7.
- Foot, H. and Howe, C. (1998). The psychoeducational basis of peer-assisted learning. In K. Topping and S. Ehly (Eds.), *Peer-assisted learning* (pp. 27-43). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Ford, N. (1995). Levels and types of mediation in instructional systems: An individual differences approach. *International Journal of Human-Computer Studies*, 43, 241-259.
- Gaden, K. (1992). *Inclusion of Gregorc's mind styles concepts in physical therapy curriculum and instruction in selected baccalaureate and post-baccalaureate programs*. Unpublished doctoral dissertation, Andrews University, Michigan.
- Gamoran, A. (1987). Organization, instruction, and the effects of ability grouping: Comment on Slavin's best-evidence synthesis. *Review of Educational Research*, 57(3), 341-345.
- Garity, J. (1985). Learning styles: Basis for creative teaching and learning. *Nurse Educator*, 10 (2), 12-16.
- George, P. (1993). Tracking and ability grouping in the middle school: Ten tentative truths. *Middle School Journal*, 24(4), 17-24.
- Goldenberg, C. (1992). Instructional conversations: Promoting comprehension through discussion. *The Reading Teacher*, 46(4), 316-326.
- Golinkoff, R. and Rosinski, R. (1976). Decoding, semantic processing and reading comprehension skill. *Child Development*, 47, 252-258.
- Gough, P. (1984). Word Recognition. In P. D. Pearson (Ed.), *Handbook of Reading Research* (pp. 225-254). New York: Longman.
- Gray, J. (1976). *A developmental perspective of cognitive style*. Available at: [http://www.eric.ed.gov/\[ED127530\]](http://www.eric.ed.gov/[ED127530]).
- Greenough, W., Black, J. and Wallace, C. (1987). Experience and brain development. *Child Development*, 58, 539-559.
- Greenwood, C., Carta, J. and Hall, R. (1988). The use of peer tutoring strategies in classroom management and educational instruction. *Social Psychology Review*, 17, 258-275.
- Gul, F. A. (1987). Field dependence cognitive style as a moderating factor in subjects: Perceptions of auditor independence. *Accounting and Finance*, 27(1), 37-48.
- Hayes, J. and Allinson, C. (1996). The implications of learning styles for training and development: A discussion of the matching hypothesis. *British Journal of Management*, 6(1), 63-73.
- (1997). Learning styles and training and development: Lessons from educational research. *Educational Psychology*, 17 (1&2), 185-193.
- (1998). Cognitive style and the theory and practice of individual and collective learning in organizations. *Human Relations*, 51(7), 847 - 871.

- Hertz-Lazarowitz, R., Sharan, S. and Steinberg, R. (1980). Classroom learning style and cooperative behavior of elementary school children. *Journal of Educational Psychology*, 72(1), 99-106.
- Hoffer, T. (1992). Middle school ability grouping and student achievement in science and mathematics. *Educational Evaluation and Policy Analysis*, 14(3), 205-227.
- Honey, P. and Mumford, A. (2000). *The learning styles helper's guide*. Maidenhead: Peter Honey Publications Ltd.
- Jacob, E. (1999). *Cooperative learning in context: An educational innovation in everyday classrooms*. Albany State University: New York Press.
- Jacobs, G. (1988). Co-operative goal structure: A way to improve group activities. *ELT Journal*, 42(2), 97-101.
- Jacobs, G. and Hall, S. (1994). Implementing cooperative learning. *English Teaching Forum*, 32(4), 2-5, 13.
- Jangaiah, C. (1998). *Learning styles*. Hyderabad: Booklinks Corporation.
- Janus, R. and Bever, T. (1985). Processing of metaphoric language: An investigation of the three-stage model of metaphor comprehension. *Journal of Psycholinguistic Research*, 14, pp. 473-487.
- Johnson, D. and Johnson, R. (1989). *Cooperation and competition: Theory and research*. Edina, MN: Interaction Book Company.
- Johnson, D., Johnson, R., Holubec, E. and Roy, P. (1984). *Circles of learning: Cooperation in the classroom*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Kathleen, A. (1993). *Learning and teaching style in theory and practice* (2nd edition). Columbia, CT: The Learner's Dimension.
- Kempermann, G., Gast, D. and Gage, F. H. (2002). Neuroplasticity in old age: Sustained fivefold induction of hippocampal neurogenesis by long-term environmental enrichment. *Annals of Neurology*, 52, 135-143.
- Kerka, S. (1986). *On second thought: Using new cognitive research in vocational education*. Available at: www.ericdigests.org/pre-924/new.htm [ERIC Digest No. 53]
- Kerr, N. (1983). Motivation losses in small groups: A social dilemma analysis. *Journal of Personality and Social Psychology*, 45(4), 819-828.
- Kerr, N. and Bruun, S. (1983). Dispensability of member effort and group motivation losses: Free-rider effects. *Journal of Personality and Social Psychology*, 44(1), 78-94.
- Kirton, M. (1976). Adaptors and innovators: A description and measure. *Journal of Applied Psychology*, 61(5), 622-629.
- (1998). *Kirton Adaption-Innovation Inventory (KAI) Manual* (3rd edition). Hertfordshire, UK: Occupational Research Centre.
- Klein, J., Erchul, J. and Pridemore, D. (1994). Effects of individual versus cooperative learning and type of reward on performance and continuing motivation. *Contemporary Educational Psychology*, 19, 24-32.
- Kogan, N. (1971). Educational implications of cognitive style. In G. S. Lesser (Ed.), *Psychology and Educational Practice* (pp. 242-292). Glenview, ILL: Scott Foresman and Co.
- Kohn, A. (1987). It's hard to get left out of a pair. *Psychology Today*, 21(10), 53-57.
- Kolb, D. (1976). *The learning style inventory: Technical manual*. Boston: McBer and Co.

- Kowoser, E. and Berman, N. (1996). Comparison of pediatric resident and faculty learning styles: Implications for medical education. *American Journal of Medical Science*, 312(5), 214-218.
- Kozhevnikov, M. (2007). Cognitive styles in the context of modern psychology: Toward an integrated framework of cognitive style. *Psychological Bulletin*, 133(3), 464-481.
- Kubes, M. (1998). Adaptors and innovators in Slovakia: Cognitive style and social culture. *European Journal of Personality*, 12(3), 187-198.
- Kulik, C. C., and Kulik, J. A. (1982). Effects of ability grouping on secondary school students: A meta-analysis of evaluation findings. *American Educational Research Journal*, 19(3), 415-428.
- Larson, C., Dansereau, D., O'Donnell, A., Hyptheker, V., Lambiotte, J. and Rocklin, T. (1984). Verbal ability and cooperative learning: Transfer of effects. *Journal of Reading Behavior*, 16(4), 289-295.
- Lefton, L. and Brannon, L. (2003). *Psychology* (8th edition). Boston: Pearson Education, Inc.
- Lehman, M. (2007). Influence of learning style heterogeneity on cooperative learning. Available at: http://hfindarticles.com/p/articles/miqa4062/is200712/ai_n21279112. Accessed July 12, 2008.
- Lenehan, M., Dunn, R., Ingham, J., Murray, J., and Signer, B. (1994). Effects of learning style intervention on college students' achievement, anxiety, anger, and curiosity. *Journal of College Student Development*, 35(6) 461-466.
- Leonard, D. and Sensiper, S. (1998). The role of tacit knowledge in group innovation. *California Management Review*, 40(3), 112-132.
- Leonard, D. and Straus, S. (1997). Putting your company's whole brain to work. *Harvard Business Review*, 75(4), 111-121.
- Lindle, J. (1994). *Review of the literature on tracking and ability grouping*. (2nd Draft). [ED384643].
- Madden, L. (1988). Improve reading attitudes of poor readers through cooperative reading teams. *The Reading Teacher*, 42(3), 194-199.
- Martin, E. and Paredes, P. (2004). Using learning styles for dynamic group formation in adaptive collaborative hypermedia systems. *ICWE Workshops*, 188-198.
- Martin, K., Bartsch, D., Bailey, C. and Kandel, E. (2000). Molecular mechanisms underlying learning-related long-lasting synaptic plasticity. In M. S. Gazzaniga (Ed.), *The new cognitive neurosciences* (2nd edition, pp. 121-137.). Cambridge: MA: The MIT Press.
- Mathes, P. and Fuchs, L. (1994). The efficacy of peer tutoring in reading for students with mild disabilities: A best-evidence synthesis. *School Psychology Review*, 23, 59-80.
- Mathison, S. Freeman, M. and Wilcox, K. (2004). *Reforming teaching/learning in a high stakes testing environment*. Albany, NY: Capital Region Science Education Partnership, University at Albany, SUNY.
- McGreal, R. (1989). Coping with large classes. *English Teaching Forum*, 27(2), 17-19.
- McKay, M., Fischler, I. and Dunn, B. (2003). Cognitive style and recall of text: An EEG analysis. *Learning and Individual Differences*, 14, 1-21.
- Messick, S. (1976). Personality consistencies in cognition and creativity. In S. Messick and Associates (Eds.), *Individuality in learning* (pp. 4-22). San Francisco: Josey-Bass.

- (1984). The nature of cognitive styles: Problems and promise in educational practice. *Educational Psychologist*, 19(2), 59-74.
- (1987). Structural relationships across cognition, personality, and style. In R. E. Snow and M. J. Farr (Eds.), *Aptitude, learning, and instruction: Cognitive and Affective Process Analysis* (Vol. 3, pp. 35-77). Hillsdale, NJ: Lawrence Erlbaum.
- (1994). The Matter of style: Manifestations of personality in cognition, learning, and teaching. *Educational Psychologist*, 29(3), 121-136.
- Miller, J. A. (1998). Enhancement of achievement and attitudes through individualized learning-style presentations of two allied health courses. *Journal of Allied Health*, 27, 150-156.
- Milleret, M. (1992). Cooperative learning in the Portuguese-for-Spanish-speakers classroom. *Foreign Language Annals*, 25(5), 435-440.
- Moore, S. (1995). Building schemata for expository text through collaboration and an integration of reading and writing. *DAI-A*, 56(3), 0878.
- Murdock, M. C., Isaksen, S. G. and Lauer, K. J. (1993). Creativity training and the stability and internal consistency of the Kirton Adaption-Innovation Inventory. *Psychological Reports*, 72, 1123-1130.
- Mynatt, C. and Doherty, M. (2002). *Understanding human behavior* (2nd edition). Boston: Allyn and Bacon.
- Nagasundaram, M. and Dennis, A. (1993). When a group is not a group: The cognitive foundation of group idea generation. *Small Group Research*, 24(4), 463-489.
- Neely, R. and Alm, D. (1993). Empowering students with styles. *The Principal*, 72(4), 32-35.
- Nicholls, G. (2002). *Developing teaching and learning in higher education*. London: Routledge Falmer.
- Oakes, J. (1985). *Keeping track: How schools structure inequality*. New Haven, CT: Yale University Press.
- (1986). Keeping Track: Part 2: Curriculum inequality and school reform. *Phi Delta Kappan*, 68, 148-153.
- O'Brien, T. and Thompson, M. (1994). Cognitive styles and academic achievement in community college education. *Community College Journal of Research and Practice*, 18(6), 547-556.
- O'Connor, K., Gruenfeld, D. and McGrath, J. (1993). The experience and effects of conflict in continuing work groups. *Small Group Research*, 24(3), 362-382.
- Oreg, S. (2003). Resistance to change: Developing an individual differences measure. *Journal of Applied Psychology*, 88(4), 680-693.
- Oreg, S., Vakola, M., Armenakis, A., Bozionelos, N., Gonzalez, L., Hrebickova, M., Kordacova, J., Mlacic, B., Feric, I., Topic, M., Saksvik, P., Bayazit, M., Arciniega, L., Barkauskiene, R., Fujimoto, Y., Han, J., Jimmieson, N., Mitsuhashi, H., Ohly, S., Hetland, H., Saksvik, I. and van Dam, K. (2008). Dispositional resistance to change: Measurement equivalence and the link to personal values across 17 nations. *Journal of Applied Psychology*, 93(4), 935-944.
- Oxford, R. (1989). *The role of styles and strategies in second language learning*. Washington, D.C.: Center for Applied Linguistics.
- Oxford, R. and Anderson, N. (1995). A crosscultural view of learning styles. *Language Teaching*, 28, 201-215.

- Oxford, R., Ehrman, M. and Lavine, R. (1991). Style wars: Teacher-student style conflicts in the language classroom. In S. Magnan (Ed.), *Challenges in the 1990s for college foreign language programs* (1-25). Boston: Heinle and Heinle.
- Pankratius, W. (1997). Preservice teachers construct a view on teaching and learning styles. *Action in Teacher Education*, 18(4), 68-76.
- Pask, G. (1976). Styles and strategies of learning. *British Journal of Educational Psychology*, 56, 128-148.
- (1986). Learning strategies, teaching strategies and conceptual or learning style. In R. Schmeck (Ed.), *Learning Strategies and Learning Styles*. New York, NY: Plenum Press.
- Peacock, M. (2001). Match or mismatch? Learning styles and teaching styles in EFL. *International Journal of Applied Linguistics*, 11(1), 38-58.
- Pennington, D., Gillen, K. and Hill, P. (1999). *Social psychology*. London: Arnold.
- Pinto, J., Geiger, M. and Boyle, E. (1994). A three year longitudinal study of changes in student learning styles. *Journal of College Student Development*, 35(2), 113-119.
- Pithers, R. (2002). Cognitive learning style: A review of the field dependent-field independent approach. *Journal of Vocational Education and Training*, 54(1), 117-132.
- Price, G. (1980). Which learning style elements are stable and which tend to change over time? *Learning Styles Network Newsletter*, 1(3), 1.
- Rapp, J. (1991). The effects of cooperative learning on selected student variables. *DAI-A*, 52(10), 3516.
- Reid, J. (1987). The learning style preferences of ESL students. *TESOL Quarterly*, 21(1), 87-111.
- Reid, M. and Hammersley, R. (2000). *Communicating successfully in groups: A practical guide for the workplace*. London: Routledge.
- Reynolds, C. and Torrance, E. (1978). Perceived changes in styles of learning and thinking (hemisphericity) through direct and indirect training. *Journal of Creative Behaviour*, 12, 245-52.
- Riding, R. (1991). *Cognitive Styles Analysis*. Birmingham: Learning and Training Technology.
- (1994). *Personal style awareness and personal development*. Birmingham: Learning and Training Technology.
- (1997). On the nature of cognitive style. *Educational Psychology*, 17, (1&2), 29-50.
- Riding, R. and Cheema, I. (1991). Cognitive styles--An overview and integration. *Educational Psychology*, 11(3 & 4), 193-215.
- Riding, R., Glass, A. and Douglas, G. (1993). Individual differences in thinking: Cognitive and neurophysiological perspectives. *Educational Psychology*, 13(3 & 4), 267-279.
- Riding, R. and Rayner, S. (1998). *Cognitive styles and learning strategies*. London: David Fulton Publishers.
- Riding, R. and Sadler-Smith, E. (1997). Cognitive style and learning strategies: Some implications for training design. *International Journal of Training and Development*, 1(3), 199-208.

- Riggio, R., Whatley, M. and Neale, P. (1994). Effects of student academic ability on cognitive gains using reciprocal peer tutoring. *Journal of Social Behavior and Personality*, 9, 529-542.
- Robotham, D. (2000). *The application of learning style theory in higher education teaching*. Available at: <http://www.chelt.ac.uk/el/philg/gdn/discuss/kolb2.htm>. Accessed November 23, 2005.
- Romero-Simpson, J. (1995). The importance of learning styles in total quality management-oriented college and university courses. In Ronald R. Sims and Serbrenia J. Sims (Eds.), *The importance of learning styles*. Westport, Connecticut, London: Greenwood Press.
- Rush, G. and Moore, D. (1991). Effect of restructuring training and cognitive style. *Educational Psychology*, 11(3), 309-21.
- Sadler-Smith, E. (1998). Cognitive style: Some human resource implications for managers. *International Journal of Human Resource Management*, 9, 185-202.
- Sadler-Smith, E., Spicer, D. and Tsang, F. (2000). Validity of the Cognitive Style Index: Replication and extension. *British Journal of Management*, 11, 175-181.
- Salomon, G. and Globerson, T. (1989). When groups do not function the way they ought to. *International Journal of Educational Research*, 13, 89-99.
- Schmeck, R. (1988). Strategies and styles of learning: An integration of varied perspectives. In R. R. Schmeck (Ed.), *Learning strategies and learning styles* (pp. 317-337). New York: Plenum Press.
- Skipper, B. (1997). Reading with style. *American School Board Journal*, 184(2), 36-37.
- Slavin, R. (1983). *Cooperative learning*. New York: Longman.
- (1987). Ability grouping and student achievement in elementary schools: A best-evidence synthesis. *Review of Educational Research*, 57(3), 293-336
- (1988). Tracking: Can schools take a different route? *NEA Today*, 6, 41-47.
- (1990a). Achievement effects of ability grouping in secondary schools: A best-evidence synthesis. *Review of Educational Research*, 60, 471-499.
- (1990b). *Cooperative learning: Theory, research and practice*. Englewood Cliffs, NJ: Prentice Hall.
- (1993). Ability grouping in the middle grades: Achievement effects and alternatives. *Elementary School Journal*, 93(5), 535-552.
- Smith, C. (2004). *Learning disabilities: The interaction of students and their environments* (5th edition). Boston, MA: Allyn and Bacon – Pearson.
- Smith, K., Johnson, D. and Johnson, R. (1981). Can conflict be constructive? Controversy versus concurrence seeking in learning groups. *Journal of Educational Psychology*, 73(5), 651-663.
- Sperry, R. (1974). Lateral specialization in the surgically separated hemispheres. In F. O. Schmitt and F. G. Wordon (Eds.), *The neurosciences third study program* (pp. 5-19). Cambridge: MIT Press.
- Spires, R. (1983). The effect of teacher in-service about learning styles on students' mathematics and reading achievement. *DAI-A*, 44(5), 1325.
- Stanovich, K. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21, 360- 407.
- Stark, J. and Lattuca, L. (1997). *Shaping the college curriculum: Academic plans in action*. Boston: Allyn and Bacon.

- Steindler, D. and Pincus, D. (2002). Stem cells and neurogenesis in the adult human brain. *Lancet*, 359, 1047-1054.
- Stevens, R., Slavin, R. and Franish, A. (1989). *A cooperative learning approach to elementary reading and writing instruction: Long-term effects* (Report No. 42). Baltimore, MD: Center for Research on Elementary and Middle Schools.
- Streufert, S. and Nogami, G. (1989). Cognitive style and complexity: Implications for industrial and organisational psychology. In C. L. Cooper and I. Robinson (Eds.), *International review of industrial and organizational psychology* (pp. 43-93). Chichester, U.K.: John Wiley.
- Sudzina M. (1993). *An investigation of the relationship between the reading styles of second-graders and their achievement in three basal reader treatments*. Available at: <http://www.eric.ed.gov/> [ED353569].
- Swales, S., and Senior, B. (1999). The dimensionality of Honey and Mumford's Learning Style Questionnaire. *International Journal of Selection and Assessment*, 7(1), 1-11.
- Topping, K. (1998). Paired learning in literacy. In K. Topping and S. Ehly (Eds.), *Peer-assisted learning* (pp. 87-104). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Touba, N. (1999). Large classes: Using groups and content. *English Teaching Forum*, 37(3), 18-23.
- Tucker, R. (2007). Southern drift: The learning styles of first and third year students of the built environment. *Architectural Science Review*, 50 (3), 246-255.
- Tullett, A. D. (1995). The adaptive-innovative (A-I) cognitive styles of male and female project managers: Some implications for the management of change. *Journal of Occupational and Organizational Psychology*, 69, 359-365.
- (1997). Cognitive style: Not culture's consequence. *European Psychologist*, 2, 258-267.
- Tunmer, W. and Hoover, W. (1993). Components of variance models of language-related factors in reading disability: A conceptual overview. In R. M. Joshi and C. K. Leong (Eds.), *Reading disabilities: Diagnosis and component processes* (pp. 135-173). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Tunmer, W., Nesdale, A. and Wright, A. (1987). Syntactic awareness and reading acquisition. *British Journal of Developmental Psychology*, 5, 25-34.
- Urquhart, A. and Weir, C. (1998). *Reading in a second language: Process, product and practice*. London: Longman.
- Uttero, D. (1988). Activating comprehension through cooperative learning. *The Reading Teacher*, 41(4), 390-393.
- Vaughan, L. and Baker, R. (2001). Teaching in the medical setting: Balancing teaching styles, learning styles and teaching methods. *Medical Teacher*, 23(6), 610-612.
- Vellutino, F. and Scanlon, D. (1987). Phonological coding, phonological awareness, and reading ability: Evidence from a longitudinal and experimental study. *Merrill-Palmer Quarterly*, 33, 321-363.
- Vengopal, K. and Mridula, K. (2007). Styles of Learning and Thinking. *Journal of the Indian Academy of Applied Psychology*, 33(1), 111-118.
- Veres, J., Sims, R., and Locklear, T. (1991). Improving the reliability of Kolb's revised learning style inventory. *Educational and Psychological Measurement*, 51, 143-150.
- Vermette, P. (1998). *Making cooperative learning work: Student teams in K-12 classrooms*. Upper Saddle River, NJ: Prentice Hall.

- Volet, S., Renshaw, P. and Tietzel, K. (1994). A short-term longitudinal investigation of cross-cultural differences in study approaches using Biggs' SPQ. *British Journal of Educational Psychology*, 64, 301-318.
- Volkema, R. and Gorman, R. (1998). The influence of cognitive-based group composition on decision-making process and outcome. *Journal of Management Studies*, 35(1), 105-121.
- Watkins, R. (2004). *The handbook for economics lecturers: Groupwork and assessment*. London: Kingston University.
- Wheeler, J. (1994). Overcoming difficulties in pair and group work. *English Teaching Forum*, 34, 48-51.
- Wheelock, A. (1992). *Crossing the tracks*. New York: The New Press.
- Wiener, H. (1986). Collaborative learning in the classroom: A guide to evaluation. *College English*, 48, 52-61.
- Witkin, H. (1973). *The role of cognitive style in academic performance and in teacher-student relations*. Princeton, New Jersey: Educational Testing Service. [ED083248].
- Witkin, H., Moore, C., Goodenough, D. and Cox, P. (1977). Field-dependent and field-independent cognitive styles and their educational implications. *Review of Educational Research*, 47(1), 1-64.
- Wong Fillmore, L. (1985). When does teacher talk work as input? In S. Gass and C. Madden (Eds.), *Input in second language acquisition* (pp. 17-50). Rowley, MA: Newbury House.

Appendix

Analytic/Global Reading Styles Inventory (AGRSI)

Directions

The purpose of this inventory is to measure your analytic and global reading styles. It consists of 40 Likert-scale items. These items are categorized into two sections (20 for each). The first section aims to measure your analytic reading style whereas the second aims to measure your global reading style. The score for each item ranges from 1 to 5, where 1 stands for “Never or almost never true of me,” 2 for “Usually not true of me,” 3 for “Somewhat true of me,” 4 for “Usually true of me,” and 5 for “Always or almost always true of me.”

It is important to know that there are no right or wrong responses to all items on the inventory. A response is only right if it reflects your preference as accurately as possible. Please read each item carefully. On the attached answering sheet, record the corresponding score for each item. Each item takes one minute to complete.

Your honest responses will be appreciated.

Yours truly,

Abdel Salam El-Koumy

If you are sure that you know what to do, begin. If you have any questions, ask for assistance before starting.

Section A

Before reading,

- (1) I tend to read the title out loud to myself.**
- (2) I tend to analyze the wording of the title.**
- (3) I tend to translate the title word by word to my mother tongue.**
- (4) I tend to look at the length of the text to estimate the time I will take to finish reading it.**
- (5) I tend to look at the outer text organization structure.**

While reading,

- (6) I tend to sound out words.**
- (7) I tend to read word by word.**
- (8) I tend to get the meaning of each word.**
- (9) I prefer to analyze unfamiliar words into roots, prefixes and suffixes to determine their meanings.**
- (10) I prefer to use the dictionary when the structure of the word does not provide the meaning.**
- (11) I prefer to dissect sentences into parts to understand their meanings.**

[Continued]

(12) I tend to pay attention to linking words to understand the meaning of sentences.

(13) I tend to concentrate on details.

(14) I tend to concentrate when the material is factual.

(15) I tend to focus on the logical sequence of information in the text.

After reading,

(16) I tend to retain key words in my memory.

(17) I prefer to answer multiple choice questions to consolidate the information I have read.

(18) I tend to retain facts in my memory.

(19) I tend to recite text information aloud to myself to fix it in my memory.

(20) I like to discuss the author's line of reasoning with others to confirm my comprehension.

Section B

Before reading,

(1) I tend to visualize the title in my mind.

(2) I tend to relate the title to my prior knowledge.

(3) I tend to predict what the content will be in reaction to the title.

(4) I tend to look over the pictures and diagrams in the text.

[Continued]

(5) I prefer to get the gist of the text.

While reading,

(6) I tend to relate new information to visual concepts in my memory.

(7) I tend to receive more than one word at a time.

(8) I tend to look for ideas implicitly stated in the text.

(9) I prefer to guess word meanings from the context.

(10) I tend to draw meanings from pictures and other visuals in the text.

(11) I tend to create mental images of the events and ideas I encounter in the text.

(12) I tend to focus on the overall meaning of the text.

(13) I tend to highlight important ideas with colors.

(14) I tend to concentrate when the material is fictitious.

(15) I tend to anticipate what will come next.

After reading,

(16) I tend to retain the key ideas I highlighted while reading.

(17) I prefer to respond to open-ended questions to consolidate information learned from the text.

(18) I tend to retain the ideas and events I visualized while reading.

(19) I tend to graphically reorganize the relationship among ideas to fix them in my memory.

(20) I tend to think of the possible consequences of what I have read.

Inventory Answering Sheet

Name:-----.

Date:-----.

Directions

Record the score that represents your response to each item (1, 2, 3, 4 or 5) in each of the blanks below. Add up the individual scores of each section and put the total on the line marked TOTAL.

Section A		Section B	
No.	Score	No.	Score
1	-----	1	-----
2	-----	2	-----
3	-----	3	-----
4	-----	4	-----
5	-----	5	-----
6	-----	6	-----
7	-----	7	-----
8	-----	8	-----
9	-----	9	-----
10	-----	10	-----
11	-----	11	-----
12	-----	12	-----
13	-----	13	-----
14	-----	14	-----
15	-----	15	-----
16	-----	16	-----
17	-----	17	-----
18	-----	18	-----
19	-----	19	-----
20	-----	20	-----
TOTAL	-----	TOTAL	-----